

## MARDI Premium Plant Varieties Incentives - Selangor State Farmers Experiences

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### ABSTRACT

This study was conducted to investigate the diversity and status of MARDI plant varieties in Selangor. Several plant varieties have been chosen for the project, including MDUR 88 Durian, Melomas lime, Mutiara Wangi/Merah Rambutan, and MKL Coffee. This project was announced on social media (via MARDI Selangor's Facebook page). The announcement contains a Google form. Following the approval meeting, thirteen applicants were chosen to work on the projects. A fruit and industrial crop management seminar was successfully held as part of the training in partnership with MARDI State of Selangor and the Selangor State Economic Planning Unit (UPEN). The findings found that males accounted for 85% of the participants, showing that agriculture is more popular among them. Durians were chosen as the most appropriate plant species, and 9 acres of durian trees will be planted, with the majority of the acreage being north of Selangor in the Hulu Selangor district. MARDI anticipated that this initiative will be repeated annually to ensure that high-quality MARDI plant materials are delivered to the people of Selangor.

**Keywords:** Premium Plant; Varieties; Incentive; MARDI; Training; Durian; Rambutan; Lime; Coffee; Selangor; Farmers.

### 1. Introduction

The Malaysian Agricultural Research and Development Institute (MARDI) has received funding under the 12th Malaysia Plan (RMK-12) to carry out a Pioneer Project, which involves distributing research-based seeds and planting methods via its Technology Transfer and Entrepreneur Development Centre (TE). By assisting qualified participants and fostering agricultural innovation, this program encourages agripreneurship (Shuchi, 2019). Tree planting is more likely when seedlings are given out for free or at a reduced cost, particularly to newly educated small landowners (Ruseva et al., 2015).

The 2022–2023 Plant Variety Incentives Project, overseen by MARDI Selangor TE, helps the Ministry of Agriculture and Food Security achieve its objective of increasing the market share of premium MARDI plant varieties. Improving local regulations and stricter seedling management, along with strengthening smallholder producers, are key to ensuring sustainable delivery of quality fruit-tree germplasm (Lua et al., 2016). Despite the benefits of ICT in agriculture, female extension workers continue to use it sparingly, and women often participate in less sustainable agricultural activities than men (Yohanna et al., 2021; Osabuohien et al., 2023). High-quality seedlings significantly improve vegetative growth, flowering, and fruit development, leading to faster fruit maturation and yield earliness (Nkurikiye et al., 2024). Farmers in Malawi take an average of four years to adopt fruit tree-based agroforestry, but education, club membership, training programs, and material incentives can shorten this time (Mazungwi et al., 2024).

#### 1.1. Study Objectives

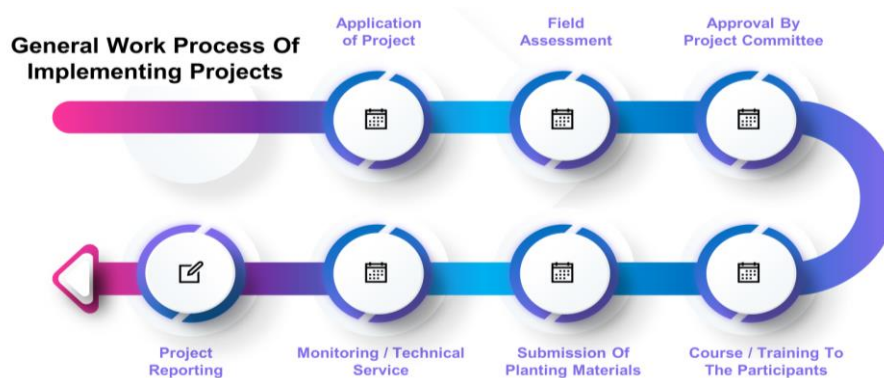
The objectives of this study are:

- 1) To cultivate MARDI's premium plant materials in Selangor throughout the RMK-12 period.
- 2) To investigate the diversity and distribution status of MARDI premium plant varieties in Selangor state.

## 2. Methodology

### 2.1. Application Process of the Study

This incentive was announced on MARDI Selangor's official Facebook page, which also featured a Google Form for submissions. As of December 31, 2022, there were 80 applications. First screening was carried out over the phone to ensure that each candidate had access to agricultural land. Following this, the implementing officer made on-site visits to evaluate the land's status, ownership, and suitability for agriculture. Following these inspections, a physical visit report and supporting papers were generated and sent to the project leader (meeting chairman) for evaluation. Farmers and agricultural specialists who successfully promote the recommended cultivation methods are in high demand (Geleta & Kifle, 2022). Figure 1 illustrates the project implementation approval process. Following the committee approval meeting, 13 applications were chosen to participate in the project.



**Figure 1.** General work process of implementing projects

### 2.2. Plant varieties selection

Several plant kinds were chosen for the project, including *MDUR 88* Durian, *Melomas* lime, *Mutiara Wangi/Merah* Rambutan, and *MKL* coffee (Table 1). Calculations for each species of plant were performed using current seedling pricing to calculate the area and quantity of seedlings to be given to project participants.

**Table 1.** The plant density/ha requirement

S. No.	Planting materials variety	Plant density/acre
1.	<i>MDUR-88</i> Durian	40
2.	<i>Melomas</i> Lime	40
3.	<i>MKL</i> Coffee	512
4.	<i>Mutiara Merah/Wangi</i> Rambutan	72

### 2.3. Training for Selected Participants

The MARDI State TE Centre of Selangor and the Selangor State Economic Planning Unit (UPEN) successfully co-hosted a seminar on fruit and industrial crop management. Landholders do not see education as a barrier, but it cannot be ruled out as an impediment due to the increasing complexities of farming and landholders' shown knowledge (Bennett and Cattle, 2014). The training curriculum had a positive impact on knowledge, perceived utility, and work performance, which will considerably aid in long-term growth (Chandra et al., 2022). The seminar

met its implementation objectives since each participant shown dedication and passion in implementing the provided lessons. This seminar contains the following four paper sessions delivered by Horticulture Research Centre and Industrial Crop Research Centre Research Officers: Introduction to Durian Plant Technology, Introduction to Rambutan Plant Technology, Introduction to Melon Plant Management and Introduction to Coffee Plant Management

### 3. Results and Discussions

#### 3.1. Gender of participants

The data from 13 participants revealed that 85% were male and 15% were female (Table 2). Although MARDI's pioneering project lacks a gender quota, it clearly demonstrates that men prefer the agricultural industry. Women farmers' lower yields are ascribed to lower levels of inputs and human capital than men, however education and access to land increase their likelihood of adopting new technology (Quisumbing, A., 1995). Women worked more in processing, marketing, and record-keeping, whereas men worked more in land clearance, bush burning, ploughing, machine operation, harvesting, and threshing (Yohanna et al., 2021). To attain equitable results, sustainable agricultural intensification should include gender-transformative strategies, such as encouraging consensus-based institutional reforms and generating beneficial synergies across several scales (Fischer et al., 2020).

**Table 2.** Gender of approved application

Gender	Number of Participants	Percentage (%)
<i>Male</i>	11	85
<i>female</i>	2	15
<b>Total</b>	<b>13</b>	<b>100</b>

#### 3.2. District area distribution of plant varieties

Table 3 displays the plants' distribution across the project members' two zone regions. According to the data, 11 acres, or 47.5% of the total in north zone, were dominantly planted with MDUR-88 Durian with Hulu Selangor contributing the highest (3.5 acres, or 14.5%). MDUR-88 Durian dominated with 13%, or 3 acres, in the district of Hulu Langat, while MARDI plant varieties accounted for 52.5%, or 12.1 acres, of the total in southern Selangor. The durian was undoubtedly the most commonly cultivated plant species developed by MARDI, with buyers showing the greatest interest in using it as planting material (Figure 2).

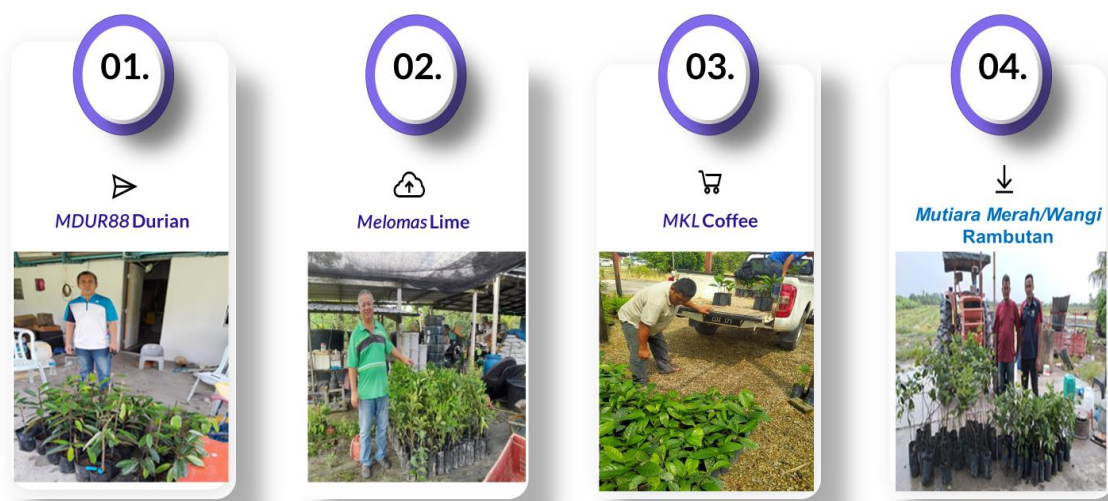
**Table 3.** District area distribution of plant varieties

Varieties/Zone	North			South		
	District	Acreage	Percentages	District	Acreage	Percentages
<b>MDUR-88 Durian</b>	Hulu Selangor	3.5	14.5	Hulu langat	3	13
	Kuala Selangor	1	4	Kuala Langat	1.5	5.5

<b>Melomas Lime</b>	Hulu Selangor	2	9	Hulu Langat	2.5	11
				Shah Alam	2	9
<b>MKL Coffee</b>	Hulu Selangor	2	9	Hulu Langat	1.1	5
<b>Mutiara Merah/Wangi Rambutan</b>	Sabak Bernam	2.5	11	Sepang	2	9
<b>Total</b>		<b>11.0</b>	<b>47.5</b>		<b>12.1</b>	<b>52.5</b>

To fulfil the demands of evolving technologies while also ensuring the viability of the seed exchange and multiplication system, seed producers and marketing cooperatives should be established and actively engaged. Direct seeding of native fruit tree species in the Brazilian Cerrado can be a low-cost restoration technique that can increase biodiversity and contribute to smallholder farmers' livelihoods (Lima et al., 2022).

Community-based seed and seedling systems in Cameroon have improved access to quality planting material, increasing crop yields by 20-50%, while demand for improved seedlings has exceeded supply (Takoutsing et al., 2014). Agriculture offers immense potential for directly employing and providing money to a broader and more underprivileged segment of the population, while also contributing significantly to national income. Improving the productivity and profitability of agriculture and related industries needs the use of agribusiness in the same way that it gives an opportunity.



**Figure 2.** Submission of Planting Materials

### 3.3. Participant percentage based of plants varieties

Table 4 provides the data analysis from 13 project participants. It was determined that 46% of durian applications were approved, followed by 31% for lime, 15% for coffee, and 8% for rambutan, which only had one application approved. Coffee and rambutan have limited acceptance due to MARDI specialists' lack of interest in the plant kinds and the difficulty of raising seedlings in adequate quantities. Community-based seed and seedling systems have enhanced access to high-quality planting material, increasing agricultural output by 20-50% and assuring long-term viability (Takoutsing et al., 2014). Small farmer agricultural development administrators should concentrate on improving performance and closing identified gaps (Collins & Mullen, 1992).

**Table 4.** Fraction by type of plant and participants

Planting materials variety	Number of participants	Percentage (%)
<i>MDUR-88</i> Durian	6	46
<i>Melomas</i> Lime	4	31
<i>MKL</i> Coffee	2	15
<i>Mutiara Merah/Wangi</i> Rambutan	1	8
<b>Total</b>	<b>13</b>	<b>100</b>

### 3.4. Type of plant, cultivation acreage and plants quantity of the projects

The committee approved applications containing a variety of plant species that had completed field screening and evaluation procedures. The project participants will plant 9 acres of durian, 8.5 acres of lime, 3.1 acres of coffee, and 2.5 acres of rambutan (Table 5). Incentives, particularly the provision of tree seedlings and money awards, have a significant impact on tree planting among farmers. The seed subsidy fails to encourage farmers to use high-quality seeds because their seed choices are influenced by factors such as land area, revenue from vegetables and fruits, and subsidy awareness (Sun et al., 2013). Poor and heterogeneous production practices in Uganda's coffee nursery industry lead to inferior, disease-prone seedlings, resulting in low productivity for smallholder farmers (Gracious et al., 2023).

**Table 5.** Fraction by type of plant, cultivation acreage and plants quantity

Planting materials variety	Cultivation area (acre)	Cultivation area percentage (%)	Plants quantity
<i>MDUR-88</i> Durian	9	39	360
<i>Melomas</i> Lime	8.5	37	340
<i>MKL</i> Coffee	3.1	13	1587
<i>Mutiara Merah/Wangi</i> Rambutan	2.5	11	180
<b>Total</b>	<b>23.1</b>	<b>100</b>	<b>2467</b>

## 4. Conclusion

Farmer training predicts agripreneurship since it is the consequence of both internal and external factors, such as personal traits, financial help, training, and market access, among others. Overall, the project's execution has gone smoothly in accordance with the intended schedule, and the applications submitted for inclusion in the project are quite promising. Along with their cooperative approach, the participants provided constructive feedback during the project's execution. The attendees clearly benefited from this talk, as seen by their observations and remarks. It was noticed that the respondents are of working age, which presents exciting potential for rural development and the provision of agricultural extension services; nonetheless, they used ICT infrequently, notably among female extension workers. It is advisable to support agricultural policies that aim to improve men's and women's participation in sustainable land use, water management, and agricultural production. Suggested for extended seminars that expand on practical, hands-on seminars that will be held soon to enhance participants' knowledge and expertise in farming crop management. To encourage agro-business initiatives and efficient use of agricultural

inputs, the government must give equal attention to male and female groups by empowering them in land use and agricultural growth. Challenges that aid in the development of the horticulture business, where stakeholders interact with one another and the agro-ecological system, can enhance creativity, social skills, and employability through the investigation of agrotourism destinations' influences on the growth of entrepreneur sales in order to boost the economic development of community-based tourism farms. MARDI expects that this effort would continue year after year to ensure that Selangor residents have access to high-quality MARDI plant materials. The study also has limitations because farmers in Malaysia have limited knowledge of crop growing agronomy procedures for field stages. More field studies are needed to standardize agro-techniques and determine the fertilizer requirements of chemical and organic fertilizers for higher yield in the various conditions connected with different states in Malaysia. As a result, significant research is required to identify the potential difference in fruit quality with tree age. Field assessments are required to increase the other MARDI plant kinds available to farmers, as well as to develop various value-added products to use excess yield. Future research will also identify the findings on the association of fertilizer levels with different kinds of sources plant varieties in stimulating the development and yield of in diverse soil types.

**Declarations****Source of Funding**

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**Competing Interests Statement**

The authors declare no competing financial, professional, or personal interests.

**Consent for publication**

The authors declare that they consented to the publication of this study.

**Authors' contributions**

All listed authors have contributed sufficiently to the work to be included as co-authors.

**Informed Consent**

All participants in this study voluntarily gave their informed consent prior to their involvement in the research.

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